CLAIMS

1. A platen for use in a chemical mechanical planarization (CMP) system, comprising:

a structure configured with at least one aperture for defining at least one localized fluid pressure platen zone; and

at least one membrane covering the at least one aperture to prevent fluid of the at least one localized fluid pressure platen zone from exiting the structure.

2. A platen as recited in claim 1, wherein:

the at least one membrane is configured with at least one first section secured to the structure around the at least one aperture.

3. A platen as recited in claim 2, wherein:

the membrane is configured with a second section surrounded by the at least one first section, and

the second section is flexible for movement relative to the at least one aperture in response to the fluid of the at least one localized fluid pressure platen zone.

4. A platen as recited in claim 3, wherein:

the movement of the second section relative to the at least one aperture is movement away from the at least one aperture in response to the fluid of the at least one localized fluid pressure platen zone.

5. A platen as recited in claim 3, wherein:

the movement of the second section relative to the at least one aperture is movement toward the at least one aperture in response to the fluid of the at least one localized fluid pressure platen zone.

6. A platen as recited in claim 1, wherein:

the at least one localized fluid pressure platen zone is defined by a plurality of the apertures; and

the at least one membrane covers all of the plurality of the apertures.

7. A platen as recited in claim 1, wherein:

the at least one localized fluid pressure platen zone is defined by a plurality of the apertures; and

the at least one membrane comprises a separate membrane covering separate groups of the plurality of the apertures, each separate membrane is configured so that the separate membranes may collectively apply differential polishing pressures to the wafer.

8. A platen for use in a chemical mechanical planarization (CMP) system, comprising:

at least one fluid-bearing platen zone having a plurality of fluid-bearing outlets for supplying fluid-bearing fluid, the at least one fluid-bearing platen zone being disposed below and being capable of providing fluid-bearing pressure on a polishing pad; and

at least one fluid-pressure platen zone comprising at least one fluid pressure port for transferring fluid-pressure fluid relative to the at least one fluid-bearing platen zone and the polishing pad, the at least one fluid pressure platen zone being disposed below the polishing pad, the at least one fluid pressure platen zone further comprising a member configured to define a flexible pocket covering the at least one fluid pressure port to prevent the fluid-pressure fluid from freely-flowing relative to the at least one fluid-bearing zone.

9. A platen as recited in claim 8, wherein the fluid-pressure fluid transferred by the at least one fluid pressure port flexes the flexible pocket to configure the flexible member so that the polishing pad achieves a particular polishing profile during a CMP operation.

10. A platen as recited in claim 9, wherein a value of fluid pressure of the fluid-pressure fluid transferred by the at least one fluid pressure port is a static pressure value that is controlled relative to a value of a pressure of the fluid-bearing fluid.

11. A platen as recited in claim 9, wherein a value of fluid pressure of the fluid-pressure fluid in the flexible pocket is a static pressure having a value in a range of pressure from about 1 to 2 psi greater than a value of a pressure of the fluid-bearing fluid.

12. A platen as recited in claim 9, wherein:

the fluid-bearing fluid has a tendency to freely-flow from the at least one fluid-bearing zone and out of the platen; and

the flexure of the flexible pocket in response to the fluid-pressure fluid transferred by the at least one fluid pressure port configures the flexible pocket so that the pocket restricts the tendency of the fluid-bearing fluid to freely-flow.

13. A platen as recited in claim 8, wherein:

the fluid-bearing outlets of the at least one fluid-bearing zone are located at a position corresponding to a central area of a wafer to be polished so that the fluid-bearing fluid tends to freely-flow in a fluid-bearing gap away from the position to provide the fluid-bearing pressure to the polishing pad; and

the fluid-pressure fluid transferred relative to the at least one fluid pressure port of the at least one fluid pressure zone deforms the flexible member into the fluid-bearing gap to restrict the tendency of the fluid-bearing fluid to freely-flow in the fluid-bearing gap away from the position while the fluid-bearing fluid still provides the fluid-bearing pressure to the polishing pad.

14. A platen for use in a chemical mechanical planarization (CMP) system in which a polishing pad is configurable to apply selected polishing pressures to different areas of a wafer to be planarized, the platen comprising:

a fluid-bearing structure configured with a first plurality of apertures for transferring polishing pressure control fluid, the apertures being configured to define a plurality of localized fluid pressure platen zones for applying selectable polishing pressure control pressures to the polishing pad; and

a membrane corresponding to each localized fluid pressure platen zone, each membrane covering respective ones of the apertures corresponding to a respective one of the localized fluid pressure platen zones, each membrane being sealed to the fluid-bearing

structure to separate the polishing pressure control fluid of the respective localized fluid pressure zone from the fluid-bearing structure, the sealing of each membrane enabling different selectable localized fluid pressures to be applied to each localized fluid pressure platen zone to provide differential polishing pressure control pressures to the polishing pad.

15. A platen as recited in claim 14, wherein:

the fluid-bearing structure is further configured with a second plurality of apertures for supplying fluid-bearing fluid, the second plurality of apertures being configured to define a second plurality of localized fluid-bearing zones for supporting the polishing pad, the fluid-bearing structure being further configured with a gap that is normally open to permit relatively free-flow of the fluid-bearing fluid to exit the fluid-bearing structure; and

each of the membranes is sealed to the fluid-bearing structure along the gap and responds to the polishing pressure control fluid from one or more of the apertures of the respective first plurality of apertures to restrict the gap and limit the flow of the fluid-bearing fluid from the fluid-bearing structure.

16. A platen as recited in claim 15, wherein:

each sealed membrane responds to the polishing pressure control fluid by becoming inflated to define a pocket that extends at least partially across the gap to limit the flow of the fluid-bearing fluid from the fluid-bearing structure.

17. A platen as recited in claim 14, wherein:

the polishing pad is configured as an endless belt;

the fluid-bearing structure provides a gap filled with fluid-bearing fluid for supporting the endless belt spaced from the platen; and

each membrane is reconfigured by the polishing pressure control fluid received from the respective first plurality of apertures of the plurality of the respective localized fluid pressure zone so that the reconfigured membrane enters the gap and restricts the flow of the fluid-bearing fluid through the gap.

18. A method of limiting consumption of fluid in a platen of a chemical mechanical planarization system, comprising the operations of:

providing the platen with at least one aperture for defining at least one localized fluid pressure platen zone; and

sealing the at least one aperture with a flexible membrane secured around the at least one aperture to prevent fluid of the at least one localized fluid pressure platen zone from exiting the platen.

19. A method as recited in claim 18, wherein the platen defines a gap between a polishing pad and the platen, the method further comprising the operations of:

transferring the fluid of the at least one localized fluid pressure platen zone relative to the at least one aperture to cause the membrane to flex; and

controlling the transferring operation to control a localized planarization pressure applied via the polishing pad to a workpiece.

20. A method as recited in claim 18, wherein the platen is a fluid-bearing platen and defines a fluid-bearing gap between a polishing pad and the fluid-bearing platen, the fluid-bearing gap extending outwardly from a central platen zone to the at least one localized fluid pressure zone, the method further comprising the operations of:

configuring the fluid-bearing platen with a plurality of apertures of the at least one aperture for defining the at least one localized fluid pressure zone outwardly of the central platen zone;

transferring the fluid of the at least one localized fluid pressure zone relative to each of the plurality of apertures to cause the respective membrane sealing the respective aperture to flex; and

controlling the transferring operation to cause the respective flexed membranes to control a localized fluid pressure applied to the polishing pad and a resulting localized planarization pressure applied via the polishing pad to a workpiece;

wherein the flexed membrane enters the gap to restrict fluid-bearing fluid of the fluid-bearing platen from exiting the fluid-bearing platen through the fluid-bearing gap.